

THE EFFECT OF DIGITAL LEADERSHIP ON INNOVATIVE WORK BEHAVIOR OF VIETNAMESE ENTERPRISES EMPLOYEES: THE ROLE OF EMPLOYEE'S DIGITAL LITERACY

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Abstract

As businesses globally transition into the digital era, digital leadership emerges as a crucial driver of innovation. A combination of leadership skills and digital technology characterizes digital leadership. This study explores the impact of digital leadership on the innovative work behavior of employees in Vietnamese enterprises, highlighting the mediating role of employees' digital literacy. Qualitative and quantitative research methodologies were employed, including in-depth interviews with six management-level personnel and five employees and surveys with 446 employees in various regions in Vietnam. The findings underscore the direct positive influence of digital leadership on innovative work behaviors. Moreover, employee's digital literacy significantly mediates this relationship, suggesting that digitally literate employees are better positioned to translate digital leadership into innovative outcomes. This study contributes to the understanding of digital leadership's role in promoting innovation in the digital age, especially in the context of Vietnamese enterprises. The insights gleaned from this research provide practical implications for businesses in Vietnam and similar contexts, emphasizing the need to cultivate digital leadership and enhance employee digital literacy to spur innovation and competitive advantage in a rapidly evolving digital landscape.

Keywords

Innovative work behavior, Digital leadership, Employee's digital literacy, Vietnam.

1. Introduction

In the context of a rapidly developing business environment, innovation has become the most important factor for the development of businesses and the national economy. Innovative work behavior in businesses has been studied by many scholars, with the conclusion that it contributes to the ability to adapt, solve problems and improve organizational performance and competitiveness (West & Farr, 1990). Research by Hansen & Birkinshaw (2007) has confirmed that digital transformation significantly promotes innovation in organizations by creating a flexible working environment and increasing access to information, resources and encourage cross-border cooperation. The integration of digital technology into business processes has opened up new opportunities to create value through innovation. The Vietnamese Government has clearly recognized the role of digital transformation and has proposed many policies to promote digital transformation, taking advantage of opportunities from the Fourth Industrial Revolution to enhance national and modern competitiveness.

diversify and encourage innovation for the economy (Ministry of Planning and Investment, 2021). Nowadays, large businesses quickly apply new technology and innovation. Meanwhile, small and medium-sized enterprises still face difficulties in resources and knowledge to effectively implement digital transformation (Vu Trong Nghia, 2021). Therefore, innovation activities at Vietnamese businesses still face many limitations. By 2021, the proportion of businesses implementing innovation will be 28.5%, a small proportion (Tran Dac Hien, 2022).

In fact, a company's innovation ability is its ability to mobilize employee knowledge and combine it to create new knowledge, thereby innovating products and/or processes. Therefore, it cannot be denied that employee's innovative work behaviors are crucial to a business's ability to innovate because people are the asset and foundation of every organization. Research on factors affecting innovative work behavior is very important and is of interest to many scholars. In Vietnam, there have been many studies showing many factors that positively impact innovative work behavior of employees in businesses, however leadership and employee literacy show that they are the most important and direct role in the innovative work behavior of employees in the enterprise (Nguyen Thi Phuong Linh *et al.* 2022; Xuan Thang Pham *et al.*, 2022). In the current context of digital transformation, when businesses still face many difficulties in adapting and promoting innovation activities, there has been an essential need to discover suitable factors, more appropriately affects innovative work behavior. This is when digital leadership and employee's digital literacy become important.

In summary, the topic of digital leadership and innovative work behavior is receiving increasing attention in Vietnam. However, research on this issue is still quite new, and the number of high-quality studies is limited. Therefore, research focusing on digital leadership and its impact on innovative work behavior, with a particular emphasis on the mediating role of employee's digital literacy, which has not ever been conducted in any previous empirical research in Vietnam, is critical for Vietnamese enterprises striving to capitalize on the opportunities presented by the digital revolution. This research direction is not just a choice but a necessity for businesses aiming to stay competitive and innovative in a fast-evolving digital landscape.

2. Literature review

2.1. Innovative work behavior

Innovative work behavior (IWB) encompasses actions undertaken by employees to generate new ideas, solutions, or processes and implement them within the organizational context (Janssen, 2000; Scott & Bruce, 1994). This goes beyond mere imagination, requiring

individuals to actively apply and transform their innovative ideas into tangible realities (West & Farr, 1990). This necessitates not only creativity but also problem-solving skills, critical thinking, and effective teamwork to promote innovation within the organizational context (Amabile, 1988; West & Farr, 1990). The process involves various activities, from exploring ideas to formation, promotion, and realization, each demanding distinct skills and resources (De Jong & Den Hartog, 2010).

2.2. Digital leadership and innovative work behavior

Digital leadership (DL) is defined as individuals adding value to organizations by combining leadership skills with digital technology (Rudito & Sinage, 2017). It represents a long-term development process, reflecting a shift from traditional leadership to digital leadership (Erhan *et al.*, 2022). Digital leadership not only requires leaders to have entrepreneurial skills and mindset, but also practical knowledge, problem-solving ability, and the ability to use and teach digital tools (Benitez *et al.*, 2022). According to research by Ordu & Nayir (2021), digital leadership style is not a completely new concept, but is actually a development and restructuring of leadership principles “traditional”, adapted to today's digital environment. This perspective emphasizes that the essence of leadership – that is, the ability to influence and guide – remains the same, but how it is practiced and manifested has changed significantly in the digital age. Zhu's study (2015) identifies five key DL characteristics: broad knowledge, creative thinking, global vision, continuous learning, and sound decision-making. The relationship between DL and IWB is a focal point in academic circles. A study by Erhan *et al.* (2022) revealed a significant correlation between digitally proficient leaders and their employees' innovative work behaviors. These leaders foster innovation by facilitating communication, collaboration, and knowledge sharing – critical for ideation and implementation of innovations. Through the above arguments, the authors hypothesize:

H1: Digital leadership has a positive influence on employees' innovative work behavior

2.3. Employee's digital literacy and innovative work behavior

The employee's digital literacy (EDL) is a scholarly topic with diverse definitions. Martin (2008) defines digital literacy as the synthesis of awareness, attitude, and skills in using digital tools and media. Ulfert-Blank (2022) supplements this by emphasizing knowledge of information and data, communication and collaboration, digital content creation, and digital safety. Digital literacy goes beyond mere computer usage; it is a multidimensional structure. Gilster (1997) describes it as a tiered system comprising perceptual, social, and technical capabilities. Buckingham (2007) extends this view by highlighting that digital literacy requires a critical lens and awareness of cultural and social forces. Ahmed *et al.* (2022) contribute by integrating behavior, individual capabilities, and performance in technology usage. These perceptual

aspects are deemed crucial for employees to navigate and thrive in a dynamically transformed digital work environment.

Research indicates a strong correlation between EDL and their IWB. Hanelt *et al.* (2021), highlighted the role of digital skills in enhancing employee contributions to innovation processes, suggesting that digital literacy helps individuals better recognize and creatively apply digital tools in problem-solving. Supporting this, Pilav-Velić *et al.* (2021) found that digital knowledge significantly contributes to IWB, with digitally proficient employees more likely to engage in innovation-driving activities. Research by Proksch *et al.* (2021) also confirmed that the ability of employees to use digital tools such as big data analysis,... helps them develop and create new ideas, products, and services. Through the above arguments, the authors hypothesize:

H2: Employee's digital literacy positively impact on innovative work behavior of employees.

2.4. Digital leadership and employee's digital literacy

Studying on the role of DL, Shin *et al.* (2023) investigated the impact of DL on digital culture and the digital capabilities of employees, finding that DL has both direct and indirect positive effects on organizational performance. This indicates that DL plays a crucial role in fostering a culture that enhances the digital competencies of employees, thereby contributing to the sustainable operational efficiency of the organization. Additionally, Sarfraz *et al.* (2022) explored the interplay between innovation capabilities, green processes, product innovation, and DL abilities in manufacturing companies. Their findings suggest that DL enhances the creative skills and sustainable performance of employees, implying that digital leaders are instrumental in developing employees' digital capabilities. Empirical studies support this viewpoint, showing a positive correlation between DL practices and employees' digital literacy. This demonstrates that when leaders prioritize digital innovation and integrate digital tools into daily practices, they set a standard for digital engagement and competency within their team (Dąbrowska *et al.*, 2022). Therefore, the subsequent hypothesis is formulated:

H3: Digital leadership positively impact on employee's digital literacy.

2.5. The mediating role of employee's digital literacy

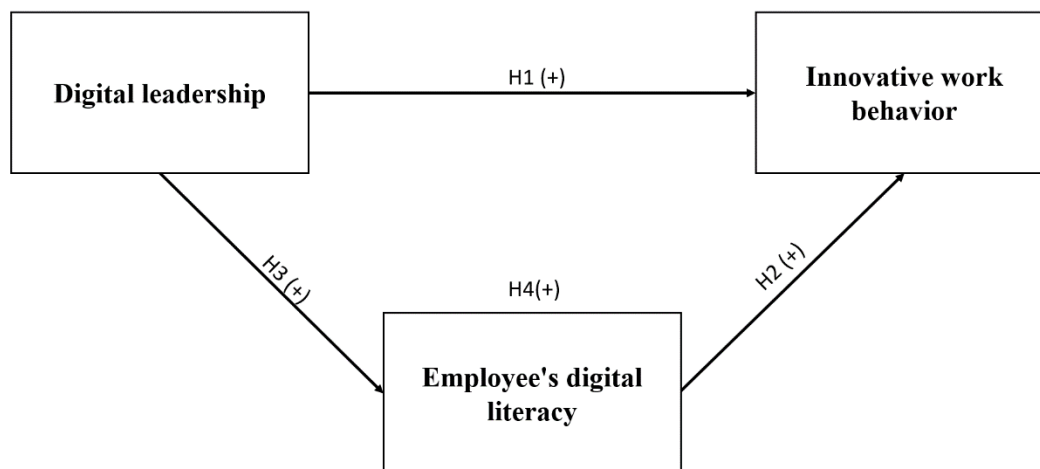
Digital leadership, emphasizing vision, encouragement, and intellectual stimulation with new technologies, significantly influences employees' attitudes toward innovation (Erhan *et al.*, 2022). The digital literacy of employees, referring to their effective use of digital tools and technologies, acts as an intermediary in this relationship. Digital literacy empowers employees to translate digital leadership's vision into innovative activities, thereby driving organizational development (Shin *et al.*, 2023). This alignment is further supported by studies

linking digital knowledge and DL with improved employee performance, positively influencing IWB (Putra *et al.*, 2023). The interaction between DL style and employees' digital literacy contributes to the sustained effectiveness of the organization, emphasizing the necessity of developing digital culture and enhancing digital literacy.

A study by Vial (2019) provides a deeper insight into the context of digital transformation, highlighting the mediating role of employee digital literacy in promoting innovative capabilities. Employee digital literacy becomes crucial in encouraging, equipping them with IWB the skills to leverage digital tools for problem-solving and collaboration. Digital leadership, by establishing priorities and investing in digital skill development, creates an environment conducive to continuous learning and adaptation to digital trends. Thus, the following is hypothesize.

H4: Employee's digital literacy has a positive moderating role in the relationship between digital leadership and innovative work behavior of employees.

Figure 1: The proposed research model



3. Research methodology

3.1. Research design

This study integrates both qualitative and quantitative methods to explore its research questions. The qualitative data obtained from in-depth interviews with six management-level personnel and five employees. These interviews were conducted online and offline and each interview range from 30 to 70 minutes. The qualitative research aimed to validate the Vietnamese translation of measurement items and to gather more profound insights into the research topic. For the quantitative data, the study employed a convenience sampling method for online and offline surveys conducted across various regions in Vietnam during November and December of 2023. The online data survey were executed through Google Forms and was sent directly by Zalo - a popular social network in Vietnam to targeted groups that align with the research criteria, whereas offline surveys were conducted directly with willing business employees.

3.2. Measurement

Digital leadership was measured by Digital leadership measurement scale from Erhan *et al.* (2022) with 5 items.

Employee's digital literacy was measured using a 5-item subscale from the Proksch *et al.* (2021).

Innovative work behavior was measured by Innovative work behavior questionnaire from Carmeli *et al.* (2009) that consisted of 6 items. All items were rated on 5-point Likert-type scale (1= strongly disagree to 5 = strongly agree).

The survey questionnaire comprised two sections: one for demographic information and the other to measure study variables DL, EDL and IWB.

3.3. Sampling

Although the study collected 464 responses, including 323 online and 141 offline submissions, only 446 were used in the data analysis after eliminating incomplete and inappropriate responses. According to Hair *et al.* (2010), the sample size should be at least five times the number of observed variables to achieve effectiveness. Therefore, the minimum total sample required for the research is 160 samples. Consequently, the number of samples collected through the study survey has met the requirements, ensuring objectivity and accuracy.

3.4. Data analysis

In-depth interviews were recorded or fast took notes with some respondents. If they did not allow recording, then it was transcribed for analysis. The interviewees with 6 managers were coded as "L1 to L6" for leader and 5 employees coded as "S1 to S5" for staff. The content was synthesized and analyzed.

The quantitative data collected from the survey was processed using statistical software packages SPSS 22.0 and AMOS 24.0. SPSS is commonly used for data analysis, while AMOS is used for structural equation modeling and path analysis, often employed in research to analyze complex relationships between variables.

4. Results

4.1 Sample profile

Among the 446 survey participants, there is a slight difference between genders, with 44.62% male and 55.38% female. Most respondents (64.13%) fall within the age group of 18 to 30, and 29.37% for the older group (31-40). The majority (84.48%) had bachelor's degrees. The majority of respondents are currently working as employees (74.44%). Working seniority is divided relatively evenly between the group with 1 to 4 years of seniority, 39.91%, and the group with 5 to 10 years of seniority, 31.17%.

Table 1: Demographic Characteristics of the sample

	Characteristics	Percentage (%)
Gender	Male	44.62
	Female	55.38
Age group	18-30	64.13
	31-40	29.37
	41-50	5.16
	51-60	1.34
Working seniority	Under 1 year	15.02
	From 1 to 4 years	39.91
	From 5 to 10 years	31.17
	From 11 to 15 years	10.54
	From 16 to 20 years	1.35
	Over 20 years	2.02
Work position	Employee	74.44
	Team leader/Deputy team leader	13.00
	Department head/Deputy department head/Manager	9.19
	Director/Deputy director	3.36
Education Status	Bachelor	84.48
	Postgraduate	15.52

4.2. Measurement model

To assess whether this research instrument is suitable for use, it is necessary to test its validity and reliability as requirements for AMOS-SEM, validity, and reliability tests are classified in the outer model test. An outer model analysis describes how each indicator relates to its latent variables. Outer model testing in this study analyzes convergent validity, discriminant validity, AVE, and reliability using composite reliability and Cronbach's alpha, as presented in Table 2.

Table 2: Factor loading, reliability, and AVE test results

Variables	Items	Factor Loading	Mean	STD	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
DL			4.223	0.826	0.833	0.834	0.502
	DL1	0.730					
	DL2	0.803					
	DL3	0.562					
	DL4	0.759					
	DL5	0.583					
EDL			3.777	0.860	0.888	0.889	0.616
	EDL1	0.702					
	EDL2	0.810					
	EDL3	0.743					
	EDL4	0.796					
	EDL5	0.785					
IWB			3.951	0.886	0.937	0.937	0.712
	IWB1	0.798					
	IWB2	0.895					
	IWB3	0.809					
	IWB4	0.796					
	IWB5	0.843					
	IWB6	0.834					

A convergent validity test of reflexive indicators can be obtained from the loading factor values for each construct. According to Hair *et al.* (2010), it is essential to ensure that the factor loading coefficients of items should be equal to or greater than 0.5. The loading factor construct values in this study ranged from 0.562 to 0.895, thus indicating that it met the threshold value of 0.5. The AVE must be higher than 0.5 (Hair *et al.*, 2010), with values of

0.502, 0.616, and 0.712 for DL, EDL, and IWB, respectively. This indicates that the model's convergent validity has also been established.

A reliability test was conducted to determine whether the research instruments were of sufficient quality. Two reliability tests were used: Cronbach's alpha and composite reliability. The rule for both reliability tests is 0.7 (Hair *et al.*, 2010). The results of the Cronbach's alpha and composite reliability tests are presented in Table 2. The results show that all constructs have reliability scores greater than 0.7, indicating they meet the alpha and composite reliability threshold values.

We conducted a discriminant validity test to ensure that each construct differed from the others in the study. We tested the discriminant validity by comparing the square root of the AVE with the correlation of latent variables. The square root of the AVE for each construct had to be higher than the highest correlation value with the other constructs. As shown in Table 3, all the variable items met this criterion, as the square root of the AVE value for each construct was higher than the other constructs (Hair *et al.*, 2010). Thus, we concluded that the DL, EDL, and IWB constructs had good discriminant validity.

Table 3: Discriminant validity test result

	Digital leadership	Employee's digital literacy	Innovative work behavior
DL	0.709		
EDL	0.506**	0.785	
IWB	0.536**	0.622**	0.844

** . Correlation is significant at the 0.01 level (2-tailed).

4.3. Structural model

The researchers selected several model fit statistics to assess how well the structural model matched the data, including the goodness of fit index (GFI), adjusted goodness of fit (AGFI), comparative fit index (CFI), Tucker Lewis index (TLI), and root mean square error of approximation (RMSEA) (Hair *et al.*, 2010).

The obtained values for these indices were compared to recommended guidelines for good model fit. The results showed that the CFI, GFI, NFI, TLI, and RMSEA values all met or exceeded the suggested thresholds, indicating the structural model provided a good fit for the data overall.

Figure 2: Measurement Model

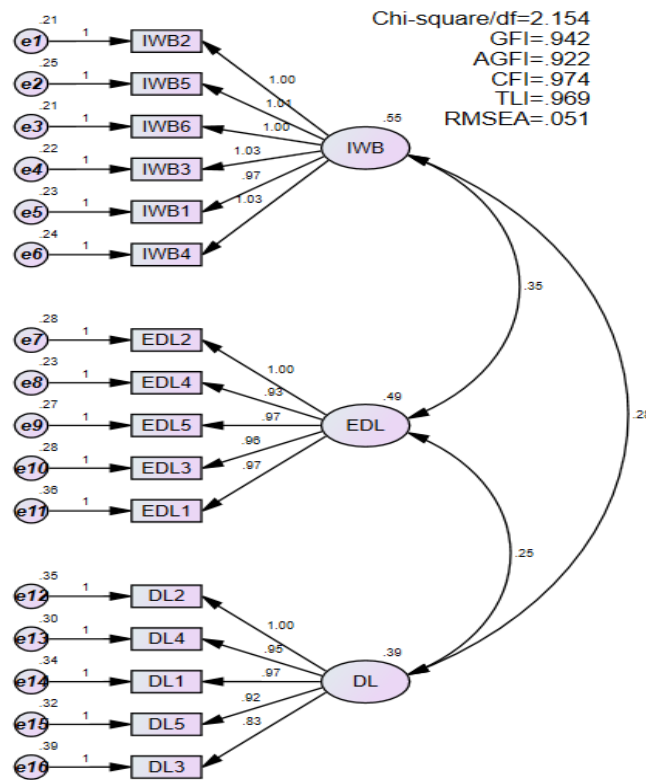


Table 4: Goodness-of-fit statistics

Model fit statistics	Recommended	Sources	Structural model
Chi-square/df	<3.00*	(Ullman & Bentler, 2003)	2.154
GFI	>0.90**	(Chin & Todd, 1995)	0.942
AGFI	>0.90**	(Chin & Todd, 1995)	0.922
CFI	>0.95**	(Hu & Bentler, 1999)	0.974
TLI	>0.95**	(Hu & Bentler, 1999)	0.969
RMSEA	<0.08**	(MacCallum <i>et al.</i> , 1996)	0.051

The obtained values of these indices all met or exceeded their recommended thresholds, providing quantitative evidence of good model fit. Specifically, the chi-square/df ratio of 2.154 was below 3, the GFI was 0.942, the AGFI was 0.92, the CFI was 0.974, the TLI was 0.969, and the RMSEA was 0.051. These results demonstrate that the hypothesized structural model suitably reproduces the covariance matrix of the observed data. Overall, the model fit statistics indicate the proposed model is a good representation of the relationships in the data.

Evaluation of the research model was conducted by the authors through the Bootstrap technique with a magnification factor of 1000 and a significance level of 5%, helping to test the research hypotheses. From the indicators in Table 5 we can have the following conclusions:

Table 5: Maximum likelihood estimates for model

Hypothesis	Beta coefficient	Standard error	t-statistic	p-value	Threshold		Supported?
					UL	LL	
Direct effect							
H1: DL -> IWB	0.31	0.062	5.041	0.002	0.194	0.434	Yes
H2: EDL -> IWB	0.50	0.052	9.634	0.001	0.400	0.602	Yes
H3: DL -> EDL	0.58	0.048	12.041	0.002	0.478	0.679	Yes
Indirect effect							
H4: DL -> EDL -> IWB	0.29	0.037	7.837	0.001	0.228	0.379	Yes

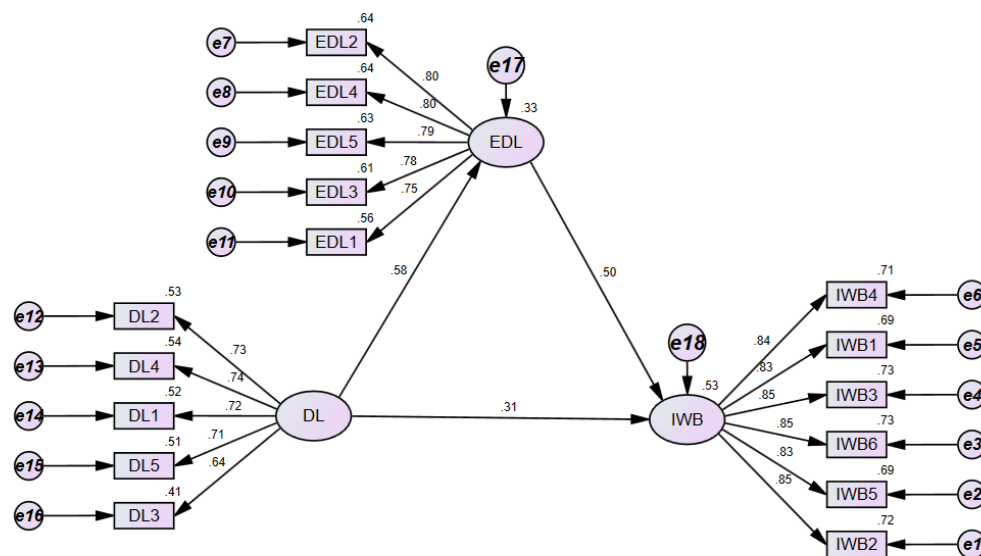
The results table showed the individual tests of the significance of the relationships between the variables in the model. Specifically, DL positively affected IWB ($\beta = 0.31$, $p = 0.002$). This supports the hypothesis that DL helps enhance IWB of employees (**H1 is accepted**). The relationship between EDL and IWB was significant ($\beta = 0.50$, $p = 0.001$). This finding signifies that EDL helps strengthen IWB of employees (**H2 is accepted**). DL also significantly positively influenced EDL, with $\beta = 0.58$ and $p = 0.002$. This indicates DL is a key contributing to the digital literacy of employees (**H3 is accepted**).

Structural equation modeling was used to test the mediation hypothesis (H4). Table result indicated the effect of mediation. With in-direct effect DL -> EDL -> IWB with $\beta = 0.29$ and $p = 0.001$. It was found that indirect effect is significant, indicated that EDL mediated between DL and IWB (**H4 is accepted**). The direct relationship is statistically significant as stated in the paragraph above, so this is a partially mediated relationship (Hair *et al.*, 2010).

According to Hair *et al.* (2010), the R^2 coefficient explains the extent to which the variance of endogenous variables is explained by exogenous variables. The results from Figure 3 show that the R^2 value of EDL is 0.33 (ie = 33%), or DL affects 33% of the variation of EDL. Similarly, the R^2 of IWB is 0.53 = 53%, or DL and EDL affect 53% of the variation in IWB.

The results prove that the hypothesized relationships between DL, EDL, and IWB are statistically significant and in the expected direction.

Figure 3: Structural Model AMOS-SEM



5. Discussion and implication

The following is a summary of the hypotheses in our study:

Table 6: The summary of the hypotheses

Hypothesis	Beta coefficient	t-statistics	P values	Supported
H1: DL -> IWB	0.31	5.041	0.002	Yes
H2: EDL -> IWB	0.50	9.634	0.001	Yes
H3: DL -> EDL	0.58	12.041	0.002	Yes
H4: DL-> EDL ->IWB	0.29	7.837	0.001	Yes

5.1. The effect of digital leadership on innovative work behavior

Our research demonstrates that digital leadership (DL) has a significant direct influence on employees' innovative work behavior (IWB), (Mean of DL = 4.22 and Beta coefficient = 0.31). That means according to the research sample, DL is currently being applied regularly by managers in Vietnamese businesses to promote IWB of employees in the business and achieve positive results.

Based on the results from the quantitative research, DL requires not only technological knowledge and skills but also the ability to lead and inspire in a digitalized work environment. DL creates a dynamic work environment where innovation and creativity are encouraged and supported. Results from qualitative research also support this, here are a few perceptions:

"The digital leadership in our company creates an environment that allows us to express our creativity and innovation" (S2, employee, Technology and service investment company Sconnect)

Besides, from qualitative research with the object being managers and leaders (L1: Director, Global Academy of Strategy and Innovation) commented that, *"In recent times, I have noticed that employee creativity and innovation have increased significantly, especially when they are encouraged to use new technology."*

"The role of digital leadership in promoting employee innovation is extremely important. Leadership provides guidance and direction, helping employees understand how to apply digital advancements to their work. A good leader will offer training and skill sharing programs, thereby encouraging employees to experiment and innovate" (L4: Head of planning production management department, HZO Vietnam).

In order for a manager to be able to influence and inspire the spirit of daring to dare to fail in employees at work, according to manager (L1) added that *"We encourage employees not to be afraid of failure through "setting an example" when managers are not afraid to fail and are always willing to experiment, employees will also feel safe to come up with new ideas and learn from each experience, whether successful or not"*. These managers all tend to pursue a digital leadership style, especially they attach great importance to *"setting an example"* for their subordinates, they influence their subordinates through their behavior and qualities. Managers regularly share, inspire, and always find ways to help employees develop their full potential at work. This can be a positive signal in the context of the current strong development of the 4.0 technology era. The study is consistent with previous findings by Erhan *et al.* (2022) which also shows that in the digital era, a leadership transition from traditional to digital is necessary for the organization to adapt quickly with the constantly changing global market. DL helps create a work environment where employees feel confident to test and apply new ideas, thereby promoting innovation and creativity at work.

Considering the findings on the impact of DL on IWB, it is recommended for enterprises to focus on developing digital leadership. Businesses need to invest in training and development programs for managers, providing in-depth knowledge of new technology and how to integrate it into business strategy. At the same time, managers should be encouraged to show interest in developing their employees' digital capabilities through formal courses, and leadership approaches such as modeling, coaching, and mentoring. Managers also need to create an environment in which employees feel safe experimenting and adopting new technology and can share their knowledge and experience with colleagues. In addition, actively participating in digital transformation and product or work process innovation will help digital leaders become a source of inspiration, motivating employees to maximize their potential in creation.

5.2. The effect of employee's digital literacy on innovative work behavior

Our findings reveal that employees with higher digital literacy tend to exhibit more innovative behavior at work. The effect of EDL to IWB is equal 0.50 (see figure). These employees are more adept at using digital technologies creatively, improving work processes, and developing innovative solutions. This direct positive relationship between digital literacy and innovative work behavior is demonstrated through both quantitative and qualitative studies. Quantitative studies show a direct correlation, while qualitative insights, such as those from managers and employees, reveal practical examples of how digital literacy fosters a culture of innovation and problem-solving. This outcome of the research corroborates the previous study of Pilav-Velić *et al.* (2021)

Qualitative data from our research also support this finding. Employees' digital literacy helps them understand and adapt to new technologies and encourages them to apply them creatively in their work. Several managers shared their views on the impact of digital literacy on employees' innovation behavior. For example, a manager (L1) said: "*In recent times, I have noticed that employees' creativity and innovation have increased significantly, especially when they are encouraged to use new technology*". Regarding employees, an employee (S2) responded that "*The ability to use information technology tools helps me a lot in my work. My colleagues and I can communicate and work together through digital platforms and I can use data analysis tools such as Excel... effectively to be able to make better decisions at work, the above things help me a lot to have more innovative ideas*". From the above feedback, it can be seen that on the employee side, being proficient in using digital technologies brings many positive things in the process of creating ideas, new work, thereby promoting employees' working ability and creativity.

Vietnamese businesses must be aware of the important role of developing employees' digital skills to drive innovation and improve productivity. However, employee digital literacy (EDL)

was assessed as the lowest among the three variables in our research model; the Mean of EDL is 3.77 (in Table 2), so Vietnamese businesses should improve their employee digital literacy. Digital literacy goes beyond conventional software proficiency to a deep understanding of data, analytical capabilities, and problem-solving in an ever-evolving technological environment. Strategic investment in training and skills development is needed. Recommendations include promoting continuous employee learning by providing digital knowledge to employees through online and in-person courses, focusing on the latest digital skills. Support, mentoring, and coaching programs are essential for employees to improve their critical thinking and problem-solving, integrating technology into daily tasks and projects. Businesses should create an innovation playground for employees to test and implement creative ideas, nurturing a culture of learning and innovation.

5.3. The effect of digital leadership on employee's digital literacy

In delving into the discussion and implications of our research, we assert a positive effect of DL on employees' digital literacy and unravel a dynamic interplay between leadership styles and the technical acumen of organizational members. A digital leadership approach, characterized by visionary guidance and encouragement in the digital domain, is anticipated to foster a more digitally literate employee base. This aligns with the expectation that managers, by promoting a tech-savvy culture and providing strategic direction, contribute significantly to enhancing the workforce's digital skills. The above discovery is also consistent with the previous study of Shin *et al.* (2023)

Results from the quantitative study showed a positive relationship between DL and EDL. Accordingly, the results of in-depth interviews from leaders and employees concur that digital leadership, through a guiding, supporting and encouraging approach, plays an important role in enabling employees develop their digital skills. Leadership not only provides the necessary resources but also creates an environment of learning and experimentation where employees can access and apply new technology. Here are a few comments:

"We focus on continuously updating new technologies and ensuring that employees have the opportunity to learn and apply them at work" (L3: Deputy Director of Route-to-market Solution Center , FPT Corporation).

However, there are also difficulties in raising the digital literacy of leaders' employees.

"One of the biggest difficulties in helping employees improve their digital skills and help them apply that digital knowledge in their work is that employees are "afraid" to learn to use new digital tools, but continuing to use old tools leads to unimproved work results" (L1).

"One of the difficulties that leaders must do to improve employees' digital skills is that employees do not really see the value that digital technology brings to themselves as well as the business, so employees tend to be afraid of accepting new digital knowledge" (L5: Director of Digital Transformation Center, ITG Technology Company).

In response to the significant impact of DL on enhancing employees' digital literacy, it is imperative for organizations to strategically integrate comprehensive digital literacy initiatives. Key to this approach is the implementation of robust training programs that focus on emerging digital technologies and tools, fostering an environment of continuous learning and professional development. Organizations should actively encourage the practical application of acquired digital skills in the workplace through hands-on projects and integration into existing workflows, thus ensuring that theoretical knowledge translates into practical expertise. Further, cultivating a supportive digital culture within the organization is crucial. This involves creating a safe space for experimentation with new digital tools, underpinned by a leadership that provides the necessary resources and demonstrates a commitment to digital proficiency and innovation. Tailoring training and development initiatives to cater to the diverse digital literacies of employees will ensure a more inclusive and effective upskilling process. Organizations can leverage DL to build a more digitally literate, innovative, and adaptable workforce by adopting these strategies.

5.4. The mediating role of employee's digital literacy

Through qualitative research, EDL plays a positive mediating role between the relationship DL and IWB with coefficient $\beta = 0.29$. When leaders demonstrate strong digital leadership, they make the case that innovation is not a choice but a necessity. EDL acts as an important enabler of this relationship, providing employees with the tools to enable them to incorporate digital technology insights into innovation behavior. their new creation. It's the practical aspect of EDL – the ability to turn conceptual digital ideas into tangible things – that truly amplifies the impact of DL on IWB. Qualitative research also supports the above views. Leaders believe that when employees have high digital skills, leaders' communication, guidance and motivation will be better. They can easily offer their own adjustments and ideas to employees, then employees can easily understand and apply knowledge about work expertise as well as about digital tools. can be applied practically, thereby creating creative contributions to businesses.

The above finding is consistent with Shin *et al.* (2023) study, claiming that EDL has a positive mediating effect between the relationship of DL and employee IWB, then employees can create good ideas. at work, thereby promoting business performance and enhancing business competitiveness.

6. Conclusion & limitation

Conclusion

In conclusion, our research has confirmed that digital leadership, employee's digital literacy has a positive relationship with innovative work behavior in the Vietnamese enterprises. It is admitted that digital leadership positively affects employees' digital literacy. It is recognized that employee's digital literacy is a mediating factor detailing the impact of digital leadership on employee's innovative work behavior. The result of our research is a reliable basis for managers and employers in Vietnamese enterprises to find directions and measures to enhance digital leadership and digital literacy of employees to enhance innovative work behavior of employees.

Theoretical implications

This research contributes significantly to the theoretical understanding of digital leadership's role in promoting innovative work behavior, especially within the context of Vietnamese enterprises. It validates the positive correlation between digital leadership and employee innovation, providing empirical evidence that enhances existing leadership and innovation theories. The study introduces employee digital literacy as a crucial mediating factor, offering a novel perspective on how digital competencies translate leadership into actionable innovation. This finding enriches the theoretical discourse around digital transformation in organizations, highlighting the importance of employee capabilities in leveraging digital leadership for innovation. Additionally, the research underscores the necessity of rethinking leadership paradigms in the digital era, advocating for a model that integrates technological proficiency with traditional leadership qualities. These insights offer a comprehensive framework for future research, encouraging further exploration into the dynamic interplay between digital leadership, employee digital literacy, and innovative work behavior in diverse cultural and organizational contexts.

Practical implications

The results of the research can be considered a reliable basis for managers and employers in Vietnamese businesses to find directions and measures to enhance digital leadership, employee's digital literacy to enhance employees' innovative work behavior. In practical terms, businesses in Vietnam should focus on enhancing digital leadership skills of leaders/managers. This involves not only imparting technological knowledge but also developing leaders capable of inspiring and guiding innovation in a digital context. Equally important is the cultivation of employee digital literacy, which acts as a bridge between digital leadership and innovative outcomes. Organizations should invest in comprehensive training

programs and provide access to digital resources to bolster their employees' digital skills. Furthermore, fostering a culture that values creativity and innovation is vital. This can be achieved by encouraging a mindset open to experimentation and risk-taking, and by facilitating platforms such as innovation labs or hackathons where employees can collaboratively engage in digital projects. The synergy of digital leadership and digital literacy within an organization leads to a dynamic, innovative workforce, capable of navigating and excelling in the evolving digital landscape. This approach enhances individual and team creativity and positions Vietnamese enterprises at the forefront of innovation and competitiveness in the digital era.

Limitations & future research

While diligently conducted, our research faced limitations from constrained resources, modest expertise, and time constraints. The study was conducted using the sampling method, which is a convenient method, so the data set is unevenly distributed, strongly distributed in the north of Vietnam. In addition, with the sample size used for analysis being 446, the sample's representativeness could be higher. Besides that, innovative work behavior is a factor influenced by many factors, choosing to research the influence of digital leadership, employee's digital literacy. Although our factors have been confirmed in several previous studies, there are also many concerns about the impact of other factors on employees' innovative work behavior such as remuneration policies, or other factors. Other factors related to people, the labor market, etc. However, it is impossible to include all relevant factors within the scope of the study.

To improve future research, extend survey durations, broaden scopes, and engage with participants at different intervals. Future research should expand models and consider additional variables, developing holistic models with comprehensive measurement scales.

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